Uppaway Water System
Preliminary Engineering Report (PER)

HDR Engineering, Inc. and
Douglas County Public Works

April 4, 2017

Overview

1. Why are we here?
2. What is a Preliminary Engineering Report (PER)?
3. Need for Capital Improvements
4. Project Alternatives
5. Prioritized Improvements
6. Summary and Costs
7. Questions

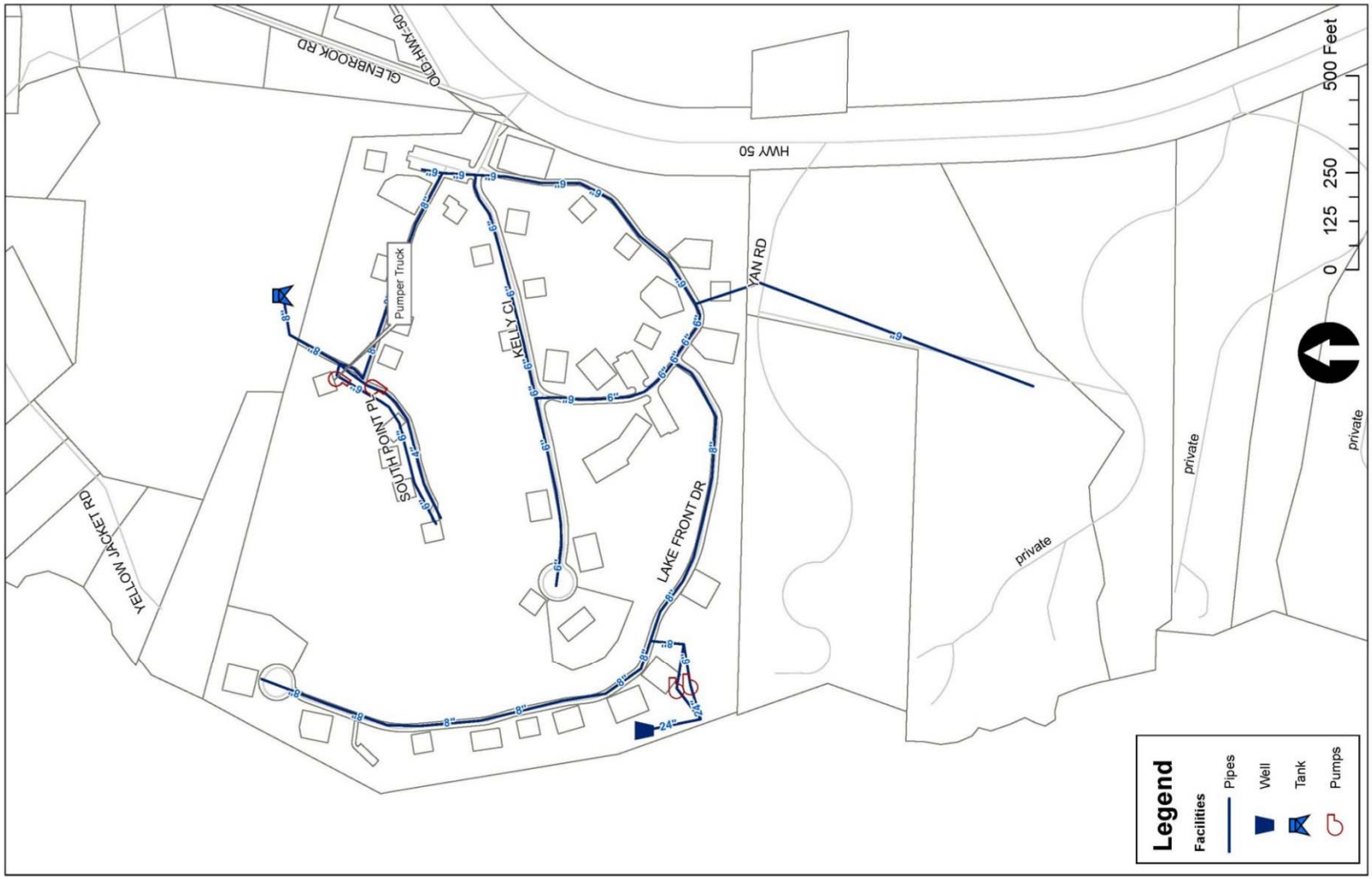
Why are we here?

- December 18, 2014
  - Adopted Resolution No. 2014R-099 establishing water rates for the Cave Rock/Uppaway Water System
  - Allow time to complete Preliminary Engineering Reports and develop a financing plan to implement future capital improvements
- January 15, 2015 – County awarded a contract with HDR Engineering to prepare Preliminary Engineering Reports
  - Zephyr Water Utility District, March 9, 2017
  - Cave Rock and Skyland, March 21, 2017
  - Uppaway, April 4, 2017
- Present information on the PER findings and recommendations

What is a Preliminary Engineering Report (PER)?

- Outline Follows USDA Bulletin 1780-2
  - Identify water system deficiencies
  - Develop and compare project alternatives to address those deficiencies
  - Identify and evaluate environmental impacts of the project alternatives
  - Prioritize recommended projects
  - Provide preliminary costs

Existing Facilities



Need for Capital Improvements

- Deficiencies 1-5 - Fire Flow, Pressure, Velocity, Line Size Criteria and Line Leaks
- Deficiency 6 - Storage Volume
- Deficiency 7 - Water Conservation
- Deficiency 8 - Wells and SCADA

Deficiencies 1 – 5 Fire Flow, Pressure, Velocity …

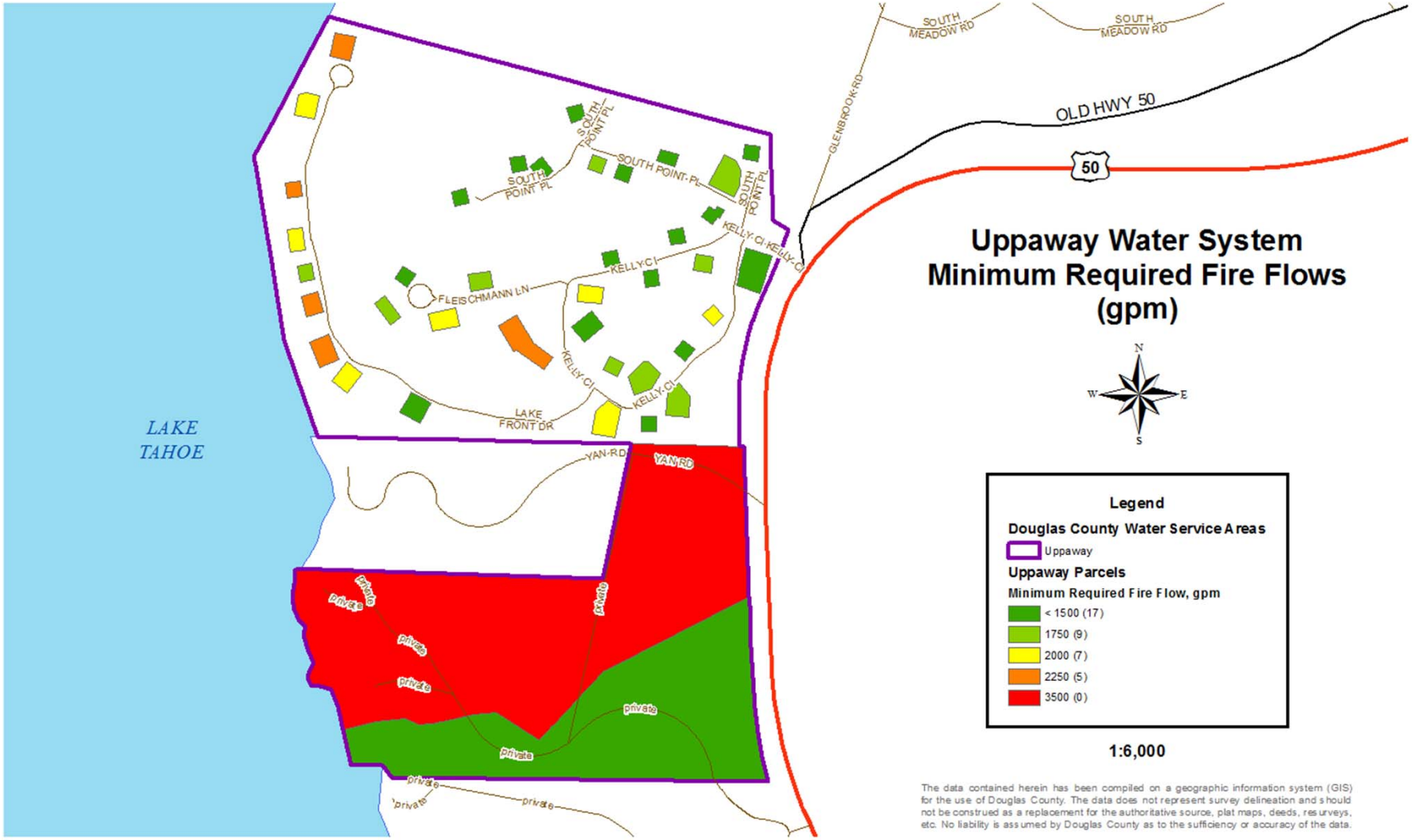
- NAC 445A.6673 Existing systems: Evaluation, justification and design of proposed water project
  - 2. Designed on the basis of historical data or other representative data that complies with accepted engineering judgment and practice, in such a manner that the proposed water project will ***enable the public water system to meet*** average day demand, maximum day demand, peak hour demand and requirements for ***fire flow and fire demand.***

Fire Flow Requirements

- International Fire Code (IFC) Table B105.1
  - Building Size and Construction
  - Fire Flow Calculation Area

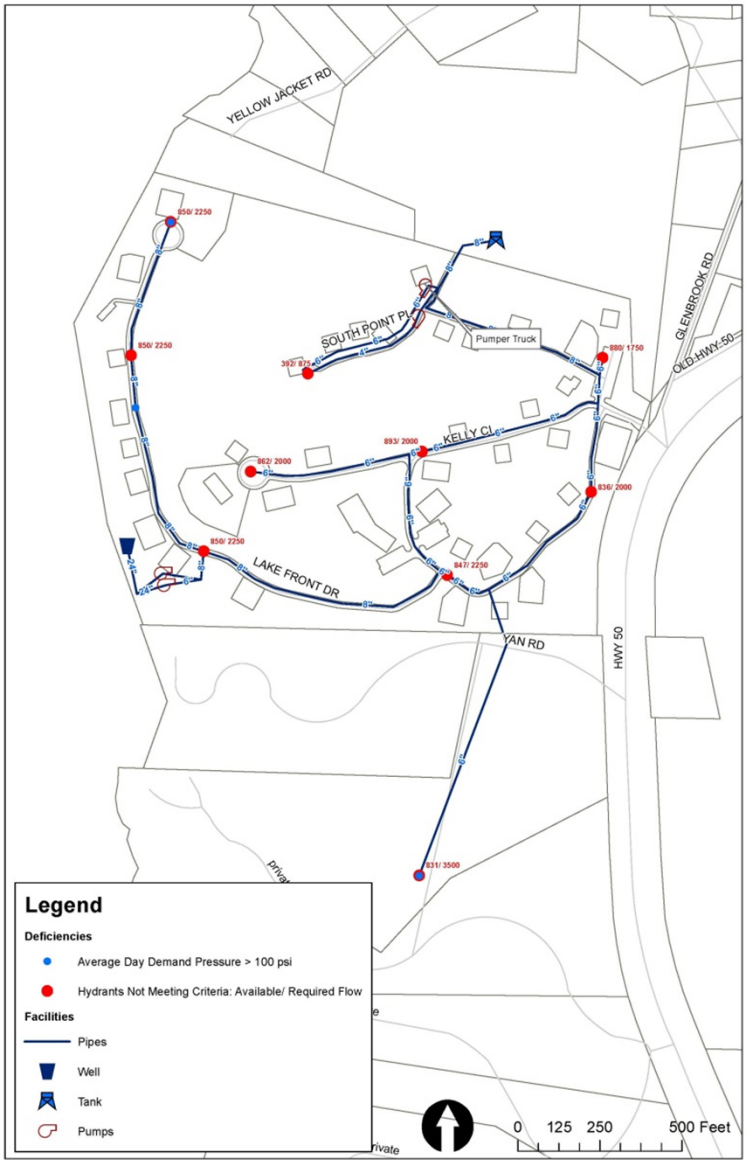
0 -3,600 sf 1,500 gpm, 2 hours	3,601 – 4,800 sf 1,750 gpm, 2 hours	4,801 – 6,200 sf 2,000 gpm, 2 hours	6,201 – 7,700 sf 2,250 gpm, 2 hours	11,301 – 13,400 sf 3,000 gpm, 3 hours

Fire Flow Requirements by Parcel

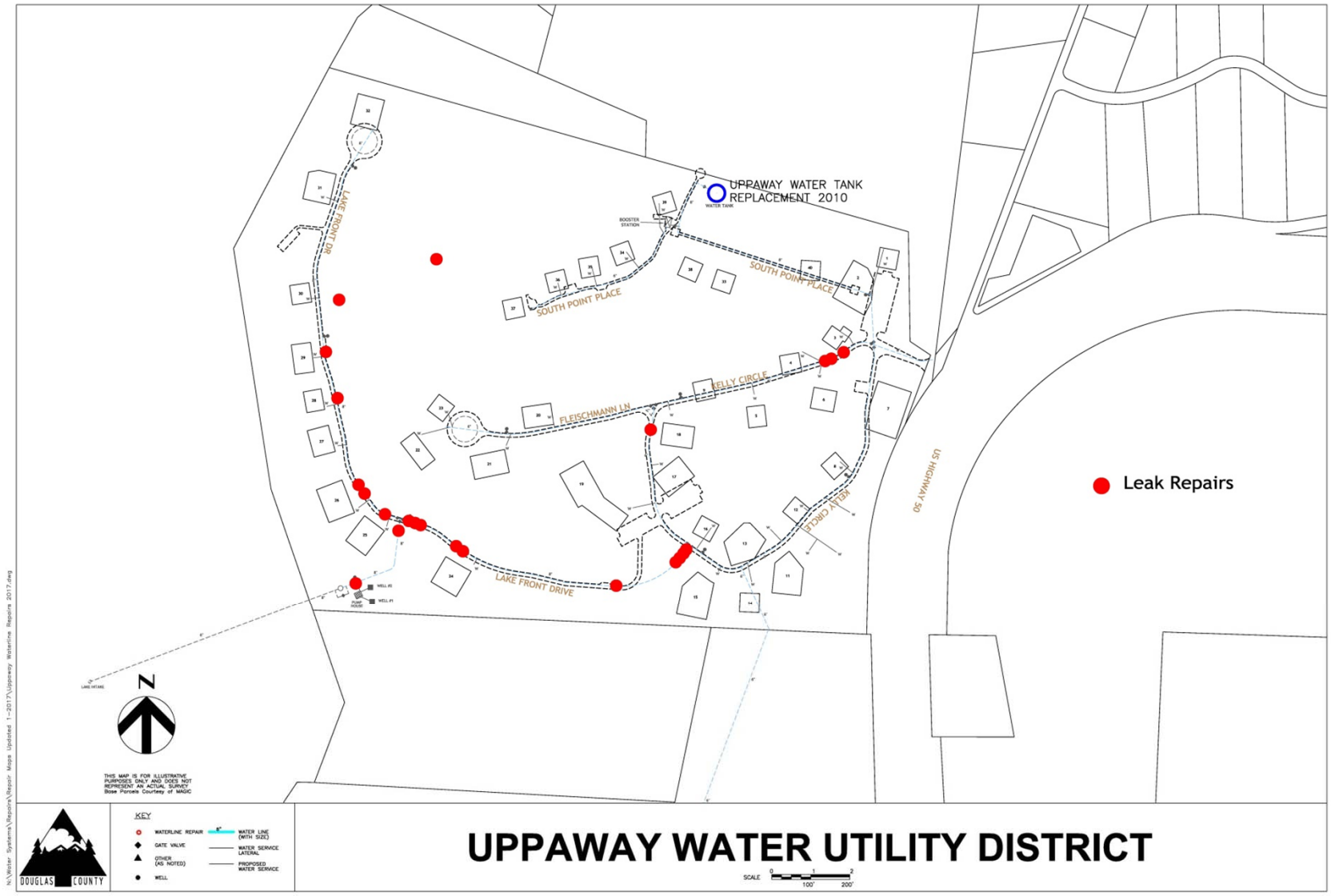


1-4: Fire Flow and Pressure Deficiencies

- System does not satisfy fire flow requirements



Deficiency 5 – Line Leaks



Deficiency 5 – Line Leaks

Deficiency 6 - Storage Volume

- Existing Storage – 362,841 gallons
- Required Storage – 430,483 gallons
  - 420,000 Gal for Fire Flow
- Deficit – 67,642 gallons

Deficiency 7 – Water Conservation

- Development approved with 500 gpd/connection
- 2016 water use was 929 gpd/connection
- Water Rights
  - 21.847 acre-feet acquired with the water system
  - 31.832 acre-feet pumped in 2016

Deficiency 8 – Wells

- Wells 1 & 2
  - Declining production, increased drawdown
  - Sanding in Well No. 2
  - 6-in Diameter Well Casing Insufficient for Pump Size

Deficiency 8 – SCADA

- SCADA Master Plan Upgrades
  - Replace Remote Terminal Units (RTU)
  - Replace Radios

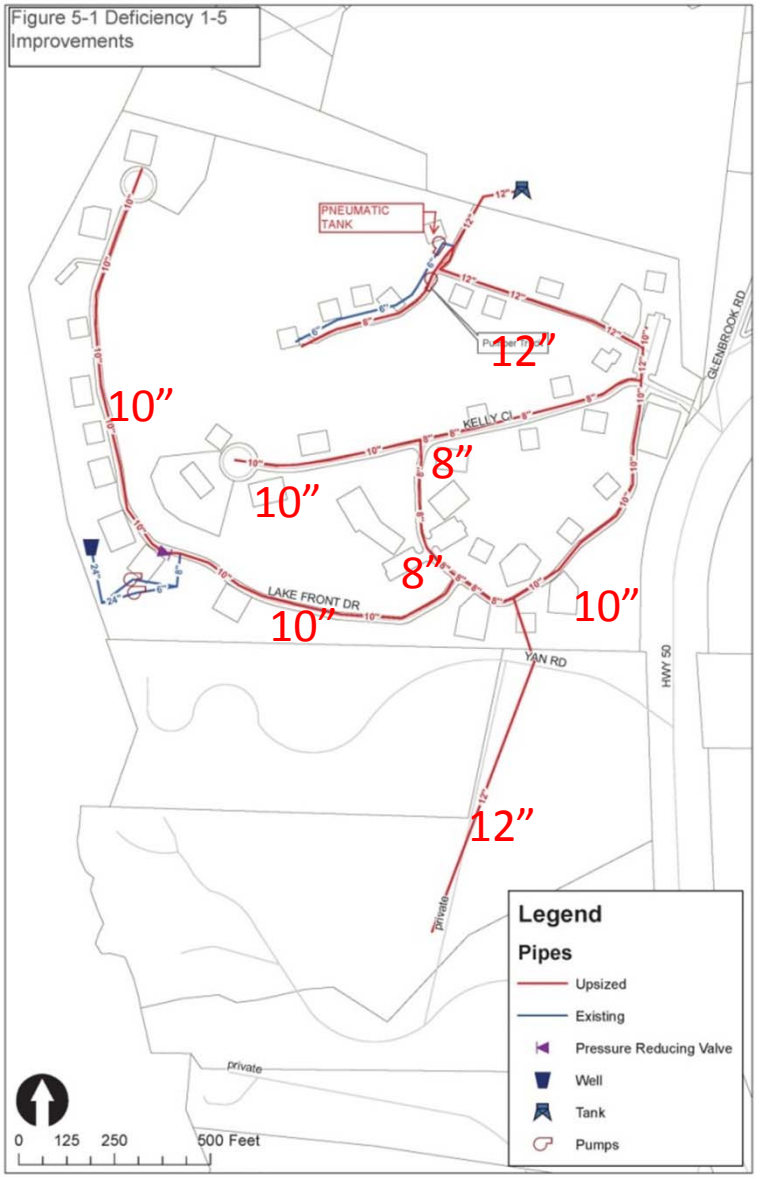
Table 4-2[1]

Location	RTU	Priority
Uppaway Tank	SCADAPack 350	3
Uppaway Booster	Tesco RTU	3
Well 1 and 2	SCADAPack	2

1 - From 2015 County SCADA Master Plan

Deficiencies 1-5
Alternative 1 – Upsize & Replace Lines

- Water lines need to be upsized to meet fire flow requirements
- New Services and Meter Pits will be installed during line replacements

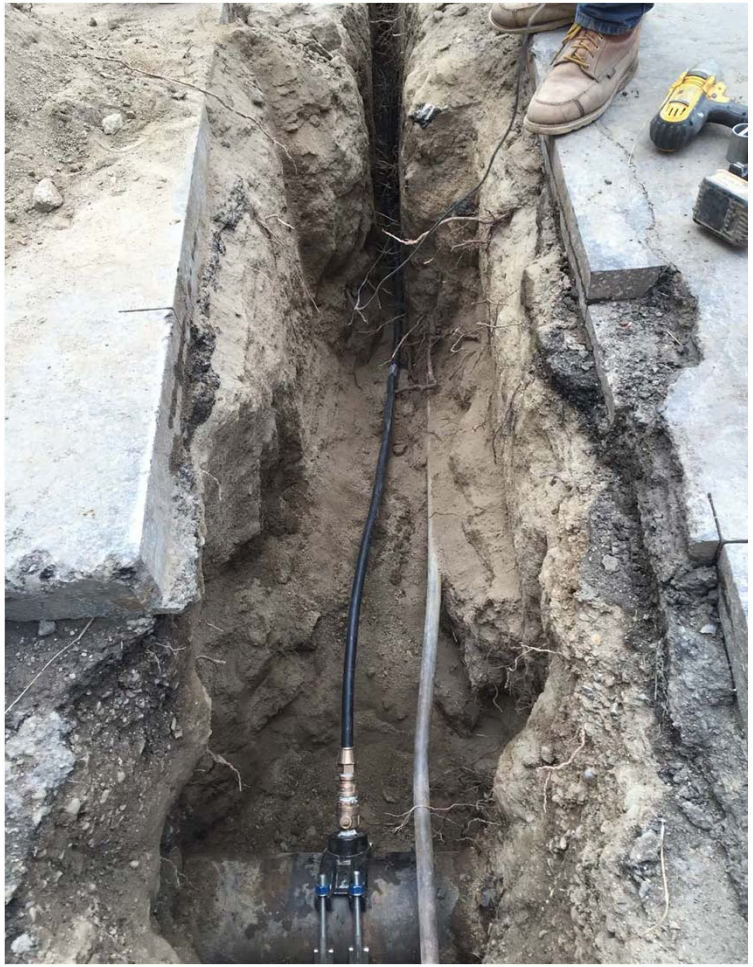


Deficiency 6 – Fire Storage

Alt 1 – 70,000 Gal Supplemental Tank

Alt 2 – Fire Sprinklers for largest residence, reduces governing fire flow to 2,250 gpm and eliminates the storage deficiency

Deficiency 7
Alternative 1 – Water Meters



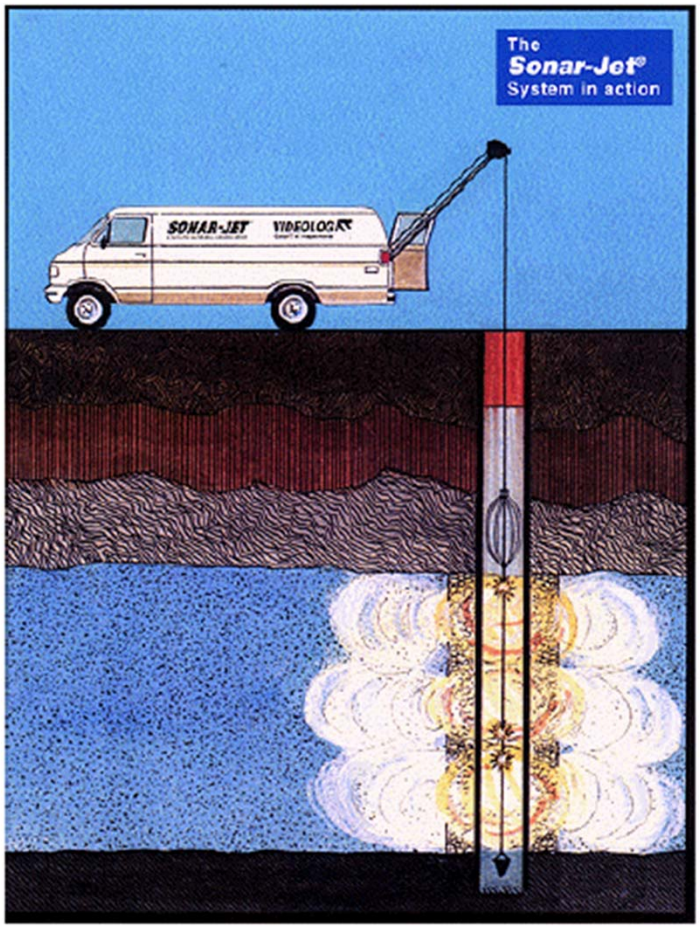
Deficiency 8
Alternative 1 – New Wells

10-In Well Casing

Deficiency 8
Alternative 2 – Rehab Wells

Many Methods Available Including:

- Chemical Cleaning
- Physical Brushing & Jetting
- Shockblasting
  - Harmonic Shockwaves & pulsating pressure jets



Harmonic Shockblasting

Alternative Ranking Criteria

- Implementation (20%)
  - Is the alternative feasible to implement?
  - Is the alternative constructible?
- Reliability (25%)
  - Will the alternative provide reliable results?
- Operation /Maintenance (40%)
  - Does the alternative require a large operator time commitment?
  - Does it require ongoing contract maintenance?
- Environmental / Permitting (15%)
  - Can TRPA thresholds be met?
  - Are there short-term and long-term effects on the environment?
  - Will the alternative be difficult to permit?

Alternative Ranking Summary

Deficiency	Alternative	Score	Rank
1-5 Fire Flow, Pressure, Velocity	1 - Upsize Pipelines	-	1
6 - Storage Volume	1 - Supplemental Tanks	2.1	2
6 - Storage Volume	2 - Sprinklers for 1860 Hwy 50	1.0	1
7 - Water Conservation	1 - Water Meters	-	1
8 - Supply Wells & SCADA	1 - Replace Existing Wells	1.4	1
8 - Supply Wells & SCADA	2 - Rehabilitate Existing Wells	1.9	2

Lower Score/Rank indicates preferred alternative.

Project Priority Criteria

- Priority 1
  - Address public health and safety risks.
- Priority 2
  - Address temporary disruption of water service or compliance, but generally minimal public health and safety impacts.
- Priority 3
  - Increase operational efficiencies, but are not likely to cause loss or disruption of service or compliance.
- Priority 4 Projects
  - Provide further gains in efficiency from Priority 3, but are not needed for operations.
  - Represent “wants” more than “needs”.

Note on Cost Opinions

- PER Cost Opinions are Level 4 or "feasibility/planning" level estimates
  - Typical range +40% to -20%
  - Costs are refined as project development and design progresses
- Construction costs are not static – construction markets subject to fluctuations
- All Project Costs Include 25% for Administrative and Contingencies

Project Priorities and Costs

Table 7-1

Deficiency No.	Description	Priority	Recommended Alternative	Capital Cost (x$1,000)
1-5	Fire Flow, Pressure, Velocity	1-2	Upsize and replace pipes	$3,232
6	Storage Volume	2	2 – Install Fire Sprinklers at largest residence	$93
7	Water Conservation	3	Install Water Meters	$568
8	Supply Wells & SCADA	2	1 – Replace existing wells	$842
			Total	**$4,735**

Project Priority Summary and Costs

- Uppaway Connection Count = 31

Deficiency No.	Recommended Alternative	Priority	Capital Cost	Monthly Rate per Customer	
				SRF Loan (20 years)	USDA Loan (40 years)
Uppaway Improvements					
1-5	Fire Flow, Pressure, Velocity	1-2	$ 3,232,000	$ 583.98	$ 438.96
6	Storage Volume	2	$ 93,000	$ 16.80	$ 12.63
7	Water Conservation	3	$ 568,000	$ 102.63	$ 77.14
8	Supply Wells & SCADA	2	$ 842,000	$ 152.14	$ 114.36
		Totals	$ 4,735,000	$ 855.55	$ 643.09

Note: Estimated monthly rates are based on customer count and will vary based on customer class (residential, commercial, irrigation) and service size.

Project Priority Summary and Costs
Cave Rock and Uppaway (310 Connections)

Deficiency No.	Recommended Alternative	Priority	Capital Cost	Monthly Rate per Customer	
				SRF Loan (20 years)	USDA Loan (40 years)
Uppaway System Improvements					
1-5	Fire Flow, Pressure, Velocity	1-2	$ 3,232,000	$ 58.40	$ 43.90
6	Storage Volume	2	$ 93,000	$ 1.68	$ 1.26
7	Water Conservation	3	$ 568,000	$ 10.26	$ 7.71
8	Supply Wells & SCADA	2	$ 842,000	$ 15.21	$ 11.44
		Subtotals	$ 4,735,000	$ 85.56	$ 64.31
Cave Rock System Improvements					
1-9	1- Modified System (Fire Flow, Pressure, Velocity, Leaks, Booster Pumping)	1	$ 10,329,000	$ 186.63	$ 140.28
10	2 - Supplemental Tanks (Hidden Woods, Lower and Upper Cave Rock Storage Volume Deficiencies)	1	$ 1,840,000	$ 33.25	$ 24.99
11	Redundant Treatment Skid (Water Treatment Plant Redundancy)	2	$ 1,420,000	$ 25.66	$ 19.29
12	Installation of Meters (Water Conservation)	3	$ 920,000	$ 16.62	$ 12.50
13	3 - Add Booster Pumps in Lake (Lake Intake Pump Station)	2	$ 139,000	$ 2.51	$ 1.89
		Subtotals	$ 14,648,000	$ 264.67	$ 198.94
Uppaway and Cave Rock Improvement Totals			$ 19,383,000	$ 350.23	$ 263.25

Note: Estimated monthly rates are based on customer count and will vary based on customer class (residential, commercial, irrigation) and service size.

Project Priority Summary and Costs

System	No. Connections	Capital Cost	Monthly Rate per Customer	
			SRF Loan (20 years)	USDA Loan (40 years)
Uppaway Improvements	31	$ 4,735,000	$ 855.55	$ 643.09
Cave Rock Improvements	279	$ 14,648,000	$ 294.08	$ 221.05
Uppaway and Cave Rock Improvements	310	$ 19,383,000	$ 350.23	$ 263.25

Note: Estimated monthly rates are based on customer count and will vary based on customer class (residential, commercial, irrigation) and service size.

Questions

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Public Comments

- Written comments can be submitted to:

  publicworks@douglasnv.us

- Uppaway PER Available on Public Works website at:

  http://www.douglascountynv.gov/DocumentCenter/View/5933

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